Title: Improving Emergency Department Throughput

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Introduction: According to National Hospital Ambulatory Medical Care Summary (NHAMCS) reports, Emergency Department (ED) visits are on the rise. In 2006, there were approximately 109 million visits in the United States. By 2008, this number increased to 123 million. The Institute of Medicine, American College of Emergency Physicians and Healthy People 2020 recognize that increased visits along with a decrease in the total number of emergency departments result in barriers to access. Major issues include overcrowding, lack of specialist availability, and prolonged wait times. According to the 2008 NHAMCS report, the median wait time to see a physician was 35 minutes with a median time spent in the department at 154 minutes. These results encompass all non-urgent and urgent visits.

Recently, United States Air Force (USAF) Hospital Langley was identified as one of nine USAF medical deployment platforms. Strategic growth initiatives were aimed at increasing the total number of beneficiaries by 8,000 to reach a target population of 40,000. This resulted in a phased hospital construction project intended to double the size of the existing facility. Part of this action plan included transitioning a 12-bed Urgent Care Center (UCC) to a 21 bed level III Emergency Department (ED).

Prior to the change, the UCC managed 34,000 patient encounters a year. This number increased by 2,000 following the increase in beneficiaries and transformation to an ED. In 2010, the Air Force Medical Operation Agency (AFMOA) reviewed Langley's Composite Health Care System (CHCS) data and found ED Door to physician wait times averaging 120 minutes, Door to admission times averaging 272 minutes, and Left without Being Seen (LWOBS) rates at 2.25%. AFMOA partnered with the ED staff to develop a process improvement (PI) work group directed at improving hospital throughput. ED staff working with AFMOA advisors identified key objectives to increase the efficiency of patient throughput. The overall goal of this project was to maximize ED safety, efficiency, and support outcomes through the capture of clinical metrics.

Methods: AFMOA advisors from emergency medicine, surgical, and inpatient services were invited to Langley for onsite PI meetings. The meeting was facilitated by AFMOA's Air Force Smart Operations for the 21st century (AFSO21) representative. During these meetings, a thorough mapping of ED operations was conducted using a time study approach. The data was utilized to eliminate non-value added steps from the ED's existing patient flow process. After identifying inefficiencies, the working group expanded to include additional AFMOA advisors as well as staff from all Langley Medical Group clinical and ancillary service areas. The team met for four days to discuss triage, patient flow, hospital admission, radiology, and laboratory exam processing.

Existing triage, patient check-in, and leadership office space was converted into a new triage area with an accompanying Fast Track (FT) clinic. Lengthy registration and triage methods were replaced with the new concept of patient sorting. This new process involves an abbreviated registration upon arrival followed by directing patients to the sorting area. The sorting nurse conducts a "mini-triage" which includes the chief complaint, vital signs, and three questions to determine if the patient meets the fast-track inclusion criteria. Non-urgent patients are sent to the FT clinic where they are seen by a physician/technician team. Urgent patients are escorted to the main ED exam area where triage and data gathering continues at bedside.

To improve patient flow, the department implemented patient care zones and a team approach. Existing ED treatment areas were divided into two zones. Each zone is staffed with a team consisting of a nurse, emergency medical technician, paramedic, and provider. Teams are encouraged to remain in designated zones to increase continuity and foster patient safety.

The process improvement team worked with inpatient nurses to develop a "bed ahead" procedure. This concept allowed inpatient units to determine an admission bed and accepting nurse prior to being called for an admission. A morning charge nurse meeting led by the nursing supervisor was initiated where all the charge nurses gather in a conference room at the beginning of the day for a brief, five-minute meeting to discuss patient and/or staffing concerns. This gives the ED an opportunity to request additional staff if needed and to communicate to the other units about possible admissions or transfers. Standing admission orders were also developed and put into practice.

Interdepartmental collaboration efforts included a designated ED drop-off location in laboratory services so ED staff did not have to wait for lab personnel availability to physically receive patient specimens. Radiology partnered with ED to share the transportation of patients between the two departments. Patients are escorted to radiology by ED staff but are brought back to their room by radiology team members.

Results: Within six months, the ED saw decreases in "door to door", "door to floor", "door to doc", LWOBS, and "greater than six-hour stay" times as noted in the table below. An increase in transfer rate did not go unnoticed.

Incorporating a dedicated fast track only slightly decreased the non-urgent "door to door" time by five minutes (approximately 0.5%) but indirectly decreased the urgent "door to door" time by approximately 27%. The LWOBS rate also decreased from 2.25% to less than 0.5%.

Abbreviated registration, mini-triage, and the "pull until full" concept increased triage efficiency and significantly decreased the "door to doc" time by 63%. Additionally, this seemed to correlate with a 90% decrease in patient complaints directed at wait times.

Hospital admission initiatives improved communication between the department and the inpatient units which helped decrease the "door to floor" time by approximately 27% and is associated with a 0.6% decrease in the "greater than six-hour stay". Standing admission orders allow for more patients to be pulled to the floor versus pushed.

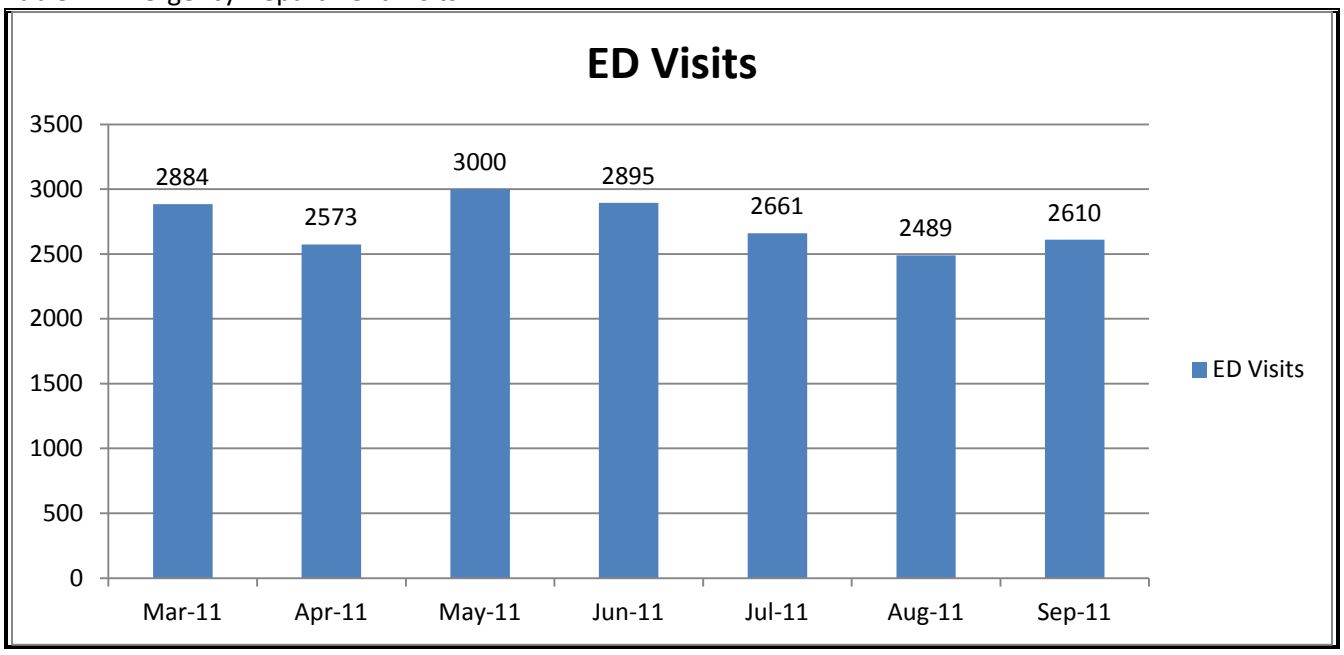
Collaboration with ancillary services allowed for enhanced availability of ED staff. This presented an increase in the amount of time team members were able to participate in direct patient care rather than having to spend time out of the department.

There was a 0.6% increase in the amount of out of network transfers. It is hypothesized that with the conversion of the UCC to an ED and the addition of 8,000 new beneficiaries, 2,000 of which are over 60 years old, there was an increase in the number of urgent patient complaints. This, coupled with the lack of specialty services, has led to more patients being transferred to higher levels of care.

Table 1. Emergency Department Metrics

Metric	Air Force Medical Service (AFMS) Goals	March 2011	September 2011
ED Door-to-door time (Non-urgent/urgent)	60/180 min	120/172 min	115/125 min
ED door to floor time	180 min	272 min	200 min
Main ED door-to-doc	30 min	120	45 Min
Leave w/out being seen	< 1.25%	2.25%	< 0.5%
% greater than 6 hr stay	< 1%	1.6	1%
% transfers to network	1%	0.88	1.5 %

Table 2. Emergency Department Visits



Limitations: The ED uses a 5-level Emergency Severity Index triage system to distinguish patient acuity levels. CHCS does not reflect these 5 levels; it only delineates urgent and non-urgent patient categories. This with the lack of an electronic charting system limits our ability to gather specific data points to better analyze the correlation of successful or failed interventions. The ED has outgrown the amount of

space required to support Langley's increased beneficiary population. Specialty services have not fully grown to meet the demands of a population with more acute needs. Major staffing turnover and deployment demands decreased the amount of trained staff. Although times vary, "pull until full" or sorting is limited by bed availability; generally this falls between 0100 and 0900 hours.

Conclusions: These process changes improved emergency department efficiency and throughput. All measures monitored during the study showed trends in decreased overall length of stay. Statistical analysis was not performed on staff satisfaction however; personnel expressed an overwhelming increase in satisfaction with these process improvements. This model can be replicated throughout military and civilian health systems without increases to staffing or major capital outlay. Future initiatives are directed at further improving ED throughput in order to meet pre-determined AFMS goals. These include the completion of current construction on our new ED, the addition of an electronic charting system, bolstering of specialty services, and the utilization of physician scribes.